

Chapter 5

Probability

5.1

probability

- the likelihood or chance of an event occurring
- Probability = $\frac{\text{favourable outcomes}}{\text{possible outcomes}}$
- can be expressed as a ratio, fraction, or percent

outcome

- one possible result of a probability experiment

favourable outcome

- a successful result in a probability experiment

$P(A)$ is a short way to write "the probability of A occurring."

Key Ideas

- Probability = $\frac{\text{favourable outcomes}}{\text{possible outcomes}}$

$$P(\text{red}) = \frac{\text{5 red jellybeans}}{\text{5 red + 5 green + 5 black jellybeans}}$$

- Probability can be written as a fraction, a ratio, or a percent.

$$P(\text{red}) = \frac{5}{10} \text{ or } 5:10 \text{ or } 50\%$$

- The probability of an impossible event is 0 or 0%.

$$P(\text{yellow}) = \frac{0}{10} \text{ or } 0:10 \text{ or } 0\%$$

- The probability of a certain event is 1 or 100%.

$$P(\text{jellybean}) = \frac{10}{10} \text{ or } 10:10 \text{ or } 100\%$$



5.2

independent events

- the outcome of one event has no effect on the outcome of another event

sample space

- all possible outcomes of an experiment

tree diagram

- a diagram used to organize outcomes
- contains a branch for each possible outcome of an event

Key Ideas

- Two events are independent if the outcome of one event has no affect on the outcome of the other event.



When you roll a die, it is not affected by another die being rolled beside it.

- You can create tables, tree diagrams, and other diagrams to organize the outcomes for two independent events.

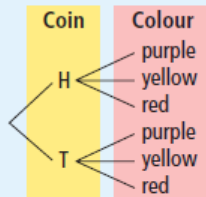
5.3

random

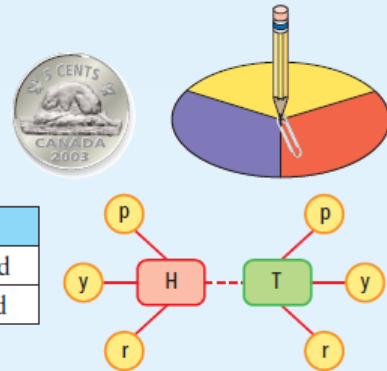
- an event in which every outcome has an equal chance of occurring

Key Ideas

- You can use a tree diagram, table, or other organizer to help determine probabilities.
- Count the favourable outcomes and divide by the total number of outcomes to find the probability.



	Purple	Yellow	Red
Heads	H, purple	H, yellow	H, red
Tails	T, purple	T, yellow	T, red



$$P(\text{heads, purple}) = \frac{1}{6}$$

5.4

Key Ideas

- Tables and tree diagrams can be useful tools for organizing the outcomes of complex independent events.

5.5

experimental probability

- the probability of an event occurring based on experimental result

theoretical probability

- the expected probability of an event occurring

Key Ideas

- The probability of an event determined from experimental outcomes is called experimental probability.



Flip two pennies 10 times.

- Experimental outcomes are usually collected in a tally chart and counted at the end of the experiment.

Coin Outcomes	Experimental Results	Number of Results
H, H		2
H, T		6
T, H		1
T, T		1

- The probability of an event determined from a list of all possible outcomes is called theoretical probability.
- Experimental probability and theoretical probability are not always the same.

$$\begin{aligned} \text{Experimental } P(T, T) &= \frac{1}{10} \\ &= 0.10 \text{ or } 10\% \end{aligned}$$

$$\begin{aligned} \text{Theoretical } P(T, T) &= \frac{1}{4} \\ &= 0.25 \text{ or } 25\% \end{aligned}$$

